

# IRRIGATED PASTURES

IN SOUTHERN ALBERTA



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Ten important points for good pastures are:

- Use good seed of adapted varieties.
- Seed shallow on well-prepared land.
- Have at least four rotation fields.
- Plan to harvest the spring surplus as hay or silage.
- Mow and harrow as required.
- Irrigate lightly and often.
- Fertilize regularly.
- Avoid overgrazing.
- Keep animals off when the ground is soft.
- Provide fresh water and minerals.

The main causes of low production are: not enough fertilizer, poor irrigation and an alkali soil. If a recommended mixture does not produce well on your farm, perhaps the site or the management practices need to be improved.



# IRRIGATED PASTURES IN SOUTHERN ALBERTA

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Many farmers in southern Alberta are finding that livestock production on irrigated pasture is one of their most profitable enterprises. They can keep more animals on the farm than ever before and can follow a diversified yet stable type of agriculture. Raising livestock is a practical and economical way of using feed crops and crop by-products; this in turn helps to keep the soil fertile.

To use the forage efficiently, you must vary the pasture area during the season by combining pasture and hay lands. Both the amount of forage that a pasture produces and the amount that animals need change as the season advances. A pasture stocked to capacity in June will be overgrazed in

August. If it is stocked right for August, feed will be wasted in June.

The carrying capacity of a pasture depends on the yield of forage, the age and class of livestock used, the amount of supplementary feed provided, the type of forage grown, and the management practices used. One pasture may yield twice as much as another, depending on management. All these factors are in your hands.

How long the pasture lasts also largely depends on you. If you manage it well, your pasture may produce good forage for ten years or more; under poor management, it may last for only two or three years.

## MIXTURES

Grasses are the basis of pasture mixtures but legumes, such as clover and alfalfa, are important too. Bacteria in the roots of legumes take nitrogen from the air and make it available to the growing plants. Legumes also improve the quality of

the feed. They should make up 40 to 50 percent of the harvested forage.

Although most of the grasses and legumes adapted to southern Alberta respond to irrigation, only a few are outstanding. A few mixtures of widely adapted species that meet most re-





*The plot with Pilgrim Ladino clover (left) gave almost a ton more feed per acre in August than the one with white Dutch clover. The grasses were the same in both plots.*

quirements are recommended. No attempt is made here to provide precise recommendations for all situations. Since new varieties of pasture plants are continually being developed, always use the latest improved varieties, adapted to local conditions. The following recommendations are based on tests at the Research Station at Lethbridge. These recommendations will change when better mixtures are found.

#### 1. Permanent Mixture (Lethbridge Mixture)

For a pasture to last four or more years on good irrigated land, seed the following mixture at 20 pounds per acre:

Orchardgrass (Chinook)	5 pounds
Bromegrass	8

Creeping red fescue	5 pounds
White clover	2

Use seed of the most winter-hardy variety of white or Ladino clover. In areas where orchardgrass may be winterkilled, substitute reed canarygrass for part or all of the orchardgrass on a pound for pound basis.

#### 2. Temporary Mixture

If pasture is needed for two or three years, seed the following mixture at 14 pounds per acre:

Bromegrass or	
orchardgrass	12 pounds
Alfalfa or alsike clover	2

The choice of species should depend on your forage needs. Use orchardgrass and alsike clover for pasture but bromegrass and alfalfa for dual-purpose or mainly hay mix-



tures. The percentage of alfalfa may be high in the seeding year and for part of the next year as well. To reduce the danger of bloat, harvest this early growth as hay.

### 3. Wet-land Mixture

For land that has a high water table or is often flooded for a long time in the spring, seed the following mixture at 10 pounds per acre:

Reed canarygrass	8 pounds
Alsike clover	2

### 4. Alkali Mixture

For alkali areas, such as those often found near irrigation ditches and canals, seed the following mixture at 16 pounds per acre:

Tall wheatgrass	10 pounds
Tall fescue (Alta)	6

If subsurface water is present, change the wet-land mixture by reducing the reed canarygrass to four pounds and adding six pounds of tall

fescue. If alkali is severe, use the alkali mixture but do not expect a first-class pasture. It is important to get some pasture started to prevent the alkali condition from spreading and to keep weeds from taking hold.

### 5. Other Mixtures

Where the supply of irrigation water is not dependable, you can still improve the yield by irrigating whenever possible. Creeping red fescue, Kentucky bluegrass, and brome-grass are useful grasses for these conditions. Alfalfa and birdsfoot trefoil are valuable legumes with any of these grasses. For example, you might seed 10 pounds of the following mixture per acre:

Creeping red fescue	8 pounds
Alfalfa	2

This would not be properly classed as an irrigated pasture and you could not expect maximum yields.

## ESTABLISHMENT

Spring is the best time to seed irrigated pastures. If the fall is more convenient, seed during the latter half of August. Do not use a grain companion crop in the fall. On areas that are often wet, delay seeding until the ground is dry or frozen. A good seedbed is highly desirable but it is often necessary to settle for something less on problem areas.

It is worth while to prepare the land carefully, as the pasture will last for several years. Use a simple method of irrigation, be sure of a supply of drinking water for the stock and

provide good access for the tractor and machinery.

Control persistent perennial weeds before seeding. Although annual weeds are a less serious problem, it is best to start with clean land.

If possible, seed directly into clean stubble. Avoid deep seeding. Firm stubble soil is satisfactory for shallow seeding and the straw gives protection from the wind. Well-packed fallow land is also suitable if it can be protected from soil drifting until the grasses are established. If necessary, use a companion crop of one

bushel of oats to the acre to get protection from wind. Seed the oats in a separate operation before the forage crop.

A conventional grain drill is satisfactory for seeding. Place the seed half an inch deep in firm soil and pack the soil well. The Lethbridge mixture feeds through a grain hopper

reasonably well, but have someone ride the drill to unplug any runs that stop feeding. On most drills a setting of one bushel of wheat seeds about 20 pounds of this mixture per acre, but check the setting after one or two rounds. For small-seed crops such as reed canarygrass and most legumes, use special grass-seeding equipment or broadcast the seed and harrow it in.

## MANAGEMENT

### First Year

Unless the land was exceptionally clean before seeding, the first growth will be weedy. Mow the first growth and leave it lying on the field if it is not too heavy. If more mowings are needed, save the forage as hay or silage. Some fall grazing is often possible if the ground is firm enough for the animals. Be sure to leave several inches of growth for winter.

When you use a grain companion crop, remove it early either as green feed or by grazing. Be careful to avoid deep hoof or machine marks. They not only damage the plants but also cause poor irrigation and make traveling with machinery rough in the future.

During the first year, irrigate often enough to keep the surface soil moist. If you use a companion crop, irrigate for the forage crop rather than the grain.

### Rotational Grazing

Rotational grazing, or allowing the

animals to graze only a part of the pasture at a time, is essential. Aim to allow grazing on each field for as short a time as possible. Then move the animals to the next field and let the forage grow up again to 8-10 inches. As the forage grows much slower in September than it does in June, you need to vary the length of the rotation period. The animals may need three times as much pasture area in September as they did in June to give the forage time to grow again. Also, because growing animals eat more forage as the season advances, they need an increasing supply of feed.

Four fields are often used but this should be a minimum number. With four fields the intent is to allow one week for grazing and three for recovery. But this is not realistic because the time needed for recovery varies for different times of the year. You can help solve the problem by saving excess forage in June as hay or silage for later feeding and by





*An oat companion crop can be grazed off if the ground is firm (left). Pasture seeded alone can also be grazed in August or September of the seeding year (right).*

grazing the aftermath on hay fields in the fall.

Studies have shown that animal production declines after the first three or four days on intensively grazed pastures. If the stay on each pasture is reduced to three days, it will be necessary to increase the number of fields to allow time for the grass to regrow. The extra fields will require more fencing and more attention to management.

### **Mowing**

It is best to mow grass left after grazing in the spring to keep it from going to seed. Natural reseeding does not improve a poor pasture. Removing the seed heads promotes the growth of new leaves and also encourages the animals to graze the field uniformly. One well-timed mowing of each field controls heading for the entire year. More mowings are often worth while for controlling weeds.

### **Harrowing**

Harrow the pasture occasionally to spread droppings. Undisturbed droppings kill the grass underneath them and promote rank, unpalatable growth around them. The pasture becomes hummocky, and irrigating and tractor traveling are difficult. The droppings have some fertilizing value, particularly if spread just before irrigating.

### **Irrigating**

Pastures are more demanding than most crops in timing of irrigation, and this is one of the important keys to high yields. Frequent, light irrigations are necessary because most of the roots of pasture plants are in the top two feet of soil. From 12 to 15 inches of water are needed each year to supplement the rainfall. Irrigate four or five times, applying two or three inches of water each time. Remove livestock while the pasture is being



irrigated and do not return them until good regrowth has been made.

## Fertilizing

Fertilizer requirements vary from farm to farm but some general recommendations can be made. Nitrogen is the most important requirement; phosphorus is also beneficial on many pastures.

Most pastures respond to an early-spring application of 50 pounds of nitrogen per acre. If the forage mixture contains 40-50 percent legume, no more nitrogen fertilizer may be needed during the season. Pastures that are mainly grass often respond to an extra 50 pounds of nitrogen in June and perhaps 30-40 pounds in July. The early-spring application gives the greatest response and is probably

the most economical even though it increases the spring pasture surplus.

The need for phosphorus is less certain, but annual spring applications of up to 50 pounds of  $P_2O_5$  per acre may be profitable. It is a good idea to leave an unfertilized strip as a check.

Broadcasting the fertilizer is apparently satisfactory. Applying it just before a rain or an irrigation brings the quickest results, but this is not essential. Some burning of the foliage may occur with broadcast applications but the damage is not serious.

Nitrogen fertilizers help to control the percentage of legume in the pasture. Applying nitrogen encourages growth of the grass at the expense of the legume but may not increase the total yield of forage. Applications for

*The ground is too soft to support the animals early in the spring and after an irrigation.  
This pasture was ruined in its second year.*





this purpose are useful occasionally but hardly economical as a consistent practice. The legume in a well-balanced mixture puts as much as 20-25 dollars' worth of nitrogen per acre into the soil.

### **Controlling Weeds**

Weeds are often only a symptom of poor grazing conditions and are not themselves the real problem. Weeds seldom get started in a vigorous pasture. Poor irrigation, inadequate fertilization, and prolonged close grazing are the most common failings.

The most troublesome weeds are wild barley (often called foxtail) and Canada thistle. Wild barley usually grows on poorly drained, alkali soils. Frequent mowing helps to check its growth but does not rid the pasture of it permanently. The wild barley will soon cease to be a problem if you can get rid of the excess soil water or salt and, by fertilization or other means, promote the growth of the pasture grasses. If you cannot

improve the soil, the best alternative is to grow a pasture mixture adapted to the conditions (see section on mixtures).

Where Canada thistle is a problem it probably was there when the pasture was seeded, although it also invades poor pastures. A combination of spraying and mowing controls the weed. On mainly grass pastures, spray with 24 ounces of 2,4-D or MCPA per acre when the flowers are in the bud stage and mow three weeks later. You may have to treat the pasture more than once. White clover is injured by 2,4-D but usually recovers.

Other weeds, such as dandelion, curled dock, sow thistle, and horsetail, occur but are seldom serious problems in established pastures. If control is necessary, herbicides can be used to advantage. If legumes are abundant, it is best to use the butyric form of 2,4-D or MCPA, namely 2,4-DB or MCPB, as it is less harmful to the legumes.

## **SELECTION AND MANAGEMENT OF LIVESTOCK**

In selecting and managing livestock for pasture, consider whether you want maximum production from each animal or from each acre. Maximum production per acre is obtained with a high stocking rate and maximum production per animal with a low stocking rate. Usually a compromise is best, so that the animals perform well but the pasture is not overgrazed.

Manage the grazing according to

the type of livestock you have. For example, it may be best to graze the milking herd or fattening cattle on fresh pasture. The dry stock or younger cattle, which have lower nutritional needs, can follow.

### **Stocking Rate and Animal Needs**

The number of animals that each acre can carry depends on the kind of livestock; the forage mixture; the soil type; environmental factors such

as temperature, humidity, and insects; and management of both livestock and pasture. A well-managed irrigated pasture provides 7,000 pounds of dry forage (14 tons of green forage) per acre during the growing season. A poor pasture may produce only half this amount. The needs of animals vary, but general guides in pounds of dry matter for a 130-day grazing period are given below. These may be used for calculating the number of animals that your pasture can carry.

- A yearling steer gaining 2.2 pounds per day needs 2,900 pounds (8-10 pounds of dry matter produces a pound of gain).
- A 1,300-pound dairy cow producing 35 pounds of milk daily needs 5,100 pounds.
- A ewe raising 1.3 lambs needs 1,000 pounds.
- A beef cow and calf need 3,800 pounds.

### **Supplemental Feeding**

It is sometimes hard for animals to get enough forage from the pasture for efficient or maximum production. Even on good pasture an animal may not be able to eat enough forage to meet all of its needs. A dairy cow needs 100-150 pounds of green forage daily (25-35 pounds of dry matter), and a yearling steer 60 pounds (15-18 pounds of dry matter). If the pasture is inadequate you may use supplements, such as hay, straw, or grain. High-producing milking cows and animals being fattened on pasture may need additional high-energy feeds

(concentrates) to give maximum production.

Cows producing over 30 pounds of milk daily should be fed grain, usually one pound of grain to five pounds of milk. Steers fed grain on pasture gain at least half a pound more per head daily than those on pasture only. Steers on grain can be sold as fat cattle off pasture or can go into the feedlot for a short finishing period. Though feeding grain does not increase the production of the pasture, the milk or beef marketed, and usually your net returns, are greater.

### **Water and Minerals**

Be sure to supply all livestock on pasture with plenty of fresh, clean water. Although you cannot always have water in the pasture, it should be as close as possible. A dairy cow producing 40 pounds of milk a day needs 15 gallons of water.

Always have minerals available. Usually salt or a salt and bonemeal mixture is all that is needed.

If the fields are large, place the water and minerals so that the animals will be encouraged to move to all areas of the pasture. This will help to give uniform grazing.

### **Shelter**

There is some advantage in providing shelter from the sun and from flies during hot weather. Steers may gain up to half a pound more each day when shade is provided. Either trees or simple, inexpensive structures are suitable. Have the shelter large enough for all the animals and for air to circulate freely.





*When grass left after grazing in the spring is mowed, the new growth is uniform and vigorous. Then (right) the livestock are likely to graze the pasture uniformly.*

## MECHANICAL GRAZING

Harvesting green forage daily for feeding to animals in a feedlot or barn has both advantages and disadvantages over conventional grazing. The following points may help you decide whether or not mechanical grazing is suitable for your farm.

### Advantages

Animal production per acre is slightly higher.

Little or no fencing is needed.

Watering the stock is usually less of a problem.

It is easier to supervise the stock.

Less judgment is needed to manage the pasture.

Forage is not wasted by trampling and soiling.

It is easier to feed supplements.

No mowing or harrowing is needed.

### Disadvantages

Initial cost of equipment is high.

Forage must be cut and fed daily.

In wet weather, equipment may damage the fields.

Labor is needed during the summer when there is often a shortage on the farm.

Good roads are needed between field and feedlot.

A well-drained feedlot is necessary.

Flies and disposal of manure may be problems.

Extra bedding is needed.

If the land is uneven or if there are many ditches and dikes, cutting may be difficult.

### Important Practices

Be sure the machine cuts clean and leaves two to three inches of stubble.

Have the land as level as possible to permit a uniform cut.

Plan fences and ditches so that they will not interfere with harvesting.

## BLOAT

The best way to avoid bloat is to keep the legume down to about 40 percent of the pasture mixture. Cattle and sheep may bloat on legumes but the risk of death is not nearly so serious as is often thought. Studies have shown that, on pastures with more than 50 percent legume, losses average less than two percent of the grazing animals. Legumes are blamed for many deaths that should be attributed to other causes.

Legumes are valuable, and with animals of ordinary commercial value it is worth while to risk the occasional death loss. With very valuable animals, it may be best to omit the legume and use extra nitrogen fertilizer (see section on fertilizing). Regulating the grazing height helps to control the growth of legumes. Continuous close grazing favors white clover; light grazing suppresses it. With alfalfa the opposite is true, and frequent close grazing eliminates it from a pasture.

Bloating is caused by retention of gas in the rumen because the animal cannot belch. The gas causes the rumen to swell, especially on the left

flank of the animal. As the gas pressure increases, the animal gasps for air and is very distressed. In acute cases the animal may die quickly unless you relieve the gas pressure at once.

To relieve bloat, try using a stomach tube first. If this does not give relief, a trocar and cannula may be effective if the cannula can be kept open. In critical cases an emergency incision into the rumen may be the only effective treatment.

Drenching the animal with de-foaming agents may help to control or prevent bloat, but use them with caution. Drenches such as turpentine, coal tar derivatives, silicones, paraffins, oils, and household detergents are often used.

It pays to take some precautions if there is a danger of animals bloating when they are turned on to pasture. It may help to make sure the animals are well filled, either from dry feed or from other pasture. Always keep dry feed available; mow swaths and let them dry right in the pasture. Get rid of chronic bloaters if possible.

## PARASITES

Sheep on pasture need to be treated regularly to control worms; cattle are seldom bothered by them. Infested sheep often have diarrhea and dirty fleeces.

Treat the sheep in spring before turning them on to pasture, and again about the end of June. You may have to treat some sheep more often. It is best to allow six weeks between graz-





*When urine spots show up as dark-green patches, the pasture needs nitrogen fertilizer.*

*Wild barley gives an early indication of poor growing conditions. Consider your irrigation and fertilization practices.*





ings on any one pasture to break the life cycle of the parasite and minimize reinfestation. As cattle are seldom bothered by internal parasites, they may be alternated with sheep in a three-week rotation.

External parasites such as flies and mosquitoes may be a problem. Chemical insecticides help to control them and maintain production from the animals. Be sure to follow closely all the cautions on the insecticide label.

## PRODUCTION FROM IRRIGATED PASTURE

Various tests on irrigated pasture were carried out at the Research Station. Production per acre and average daily gains of yearling ewes and steers on grass-legume pasture were:

Treatment	Pounds gained per acre	Pounds gained daily	Years of test
Yearling ewes			
Fertilized pasture	450	0.26	6
No fertilizer	390	0.26	6
Yearling steers			
Normal grazing	650	2.22	4
Mechanical grazing	680	2.30	4
Hormone implants	—	2.43	4
No hormones	—	2.12	4
Shade on pasture	—	2.85	2
No shade	—	2.53	2
Full grain		2.98	2
Limited grain		2.81	2
No grain		2.32	2





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